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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,544	07/01/2003	Kenneth K. Smith	10010715-3	4975

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HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400

EXAMINER

SMITH, BRADLEY

ART UNIT	PAPER NUMBER
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2891

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/611,544

Applicant(s)

SMITH ET AL.

Examiner

Bradley K. Smith

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 23-30 is/are pending in the application.
- 4a) Of the above claim(s) 26 and 27 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2 and 6-8 is/are allowed.
- 6) ☒ Claim(s) 1,3-5,9-13,23,24 and 30 is/are rejected.
- 7) ☒ Claim(s) 14,25,28 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5/2/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Newly submitted claims 26 and 27 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: they disclose how the device operates not the method of making the device.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 26 and 27 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 30 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. If the non-volatile cells between the columns and rows are not connected through transistor, resistors or diodes how are they connected?

Claim Rejections - 35 USC § 102

Art Unit: 2891

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3-5, 9, 23, 24, and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al. (US 2005/0083757). Hsu disclose providing a semiconductor substrate; forming electrically conductive columns over the semiconductor substrate; forming electrically conductive rows crossing the electrically conductive columns; forming a plurality of memory components each having a resistance value corresponding to multiple logical bits; and forming non-volatile memory cells, each formed by connecting a memory component between an electrically conductive row and an electrically conductive column wherein the non-volatile memory cells are formed without transistors for reduced space usage on the semiconductor substrate of each memory cell. With regards to claim 3 Hsu inherently disclose component is formed to have a resistance value based on an area of electrically resistive material that forms an individual memory component (by definition is $\text{thickness} \times \text{area} = \text{volume}$) . With regards to claim 4, Hsu et al. inherently disclose the component is formed to have a resistance value based on a shape (volume) of electrically resistive material that forms an individual memory component. With regards to claim 5, Hsu et al. inherently disclose the memory components are each formed to have a different resistance value based on

a different area of electrically resistive material that forms a memory component. With regards to claim 9, Hsu et al. disclose the resistive element in series with a diode.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 10-13, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Apodaca et al. (US 2003/0122170). Hsu disclose providing a semiconductor substrate; forming electrically conductive columns over the semiconductor substrate; forming electrically conductive rows crossing the electrically conductive columns; forming a plurality of memory components each having a resistance value corresponding to multiple logical bits; and forming non-volatile memory cells, each formed by connecting a memory component between an electrically conductive row and an electrically conductive column wherein the non-volatile memory cells are formed without transistors for reduced space usage on the semiconductor substrate of each memory cell. column. However Hsu et al. fail to disclose changing the resistance value with light or heat. Whereas Apodaca et al. disclose that phase-change material's resistance values may be changed though light or heat (see paragraph 0016). Therefore it would have been obvious to one of ordinary skill at the time the invention was made to combine the teachings of Hsu et al. and Apodaca et al. because one

Art Unit: 2891

would be able to control the resistance value of phase change materials and would make it easier for a manufacturer to control that variable in devices.

Allowable Subject Matter

5. Claims 2, 6-8 are allowed.

1. Claims 14, 25, and 28-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record neither teaches nor suggests within the context of the entire claim the components are each formed to have a resistance value based on a rectangular geometric shape of electrically resistive material that forms a memory component, at least some of the rectangular geometric shapes having different resistance values corresponding to an area of a rectangular geometric shape (claims 2, 6 and 29), forming a first memory cell having a memory component that indicates logical bits 00 (zero-zero); forming a second memory cell having a memory component that indicates logical bits 01 (zero-one); forming a third memory cell having a memory component that indicates logical bits 10 (one-zero); and forming a fourth memory cell having a memory component that indicates logical bits 11 (one-one) (claim 7), forming a first memory cell that indicates logical bits 00 (zero-zero) corresponding to a first resistance value based on an area of electrically resistive material that forms a memory component in the first memory cell; forming a second memory cell that indicates logical bits 01 (zero-one) corresponding to a second

Art Unit: 2891

resistance value based on an area of electrically resistive material that forms a memory component in the second memory cell; forming a third memory cell that indicates logical bits 10 (one-zero) corresponding to a third resistance value based on an area of electrically resistive material that forms a memory component in the third memory cell; and forming a fourth memory cell that indicates logical bits 1 1 (one-one) corresponding to a fourth resistance value based on an area of electrically resistive material that forms a memory component in the fourth memory cell (claim 8) forming a first non-volatile memory cell by connecting a first memory component between an electrically conductive row and a first electrically conductive column, the first non-volatile memory cell formed as part of a first layer of non-volatile memory cells; and forming a second non-volatile memory cell by connecting a second memory component between the electrically conductive row and a second electrically conductive column, the second non-volatile memory cell formed as part of a second layer of non-volatile memory cells. the second layer formed over the first layer (claims 14 and 28), memory cells having respective resistive components connected between respective row and column traces without passing through isolation circuitry comprises providing the memory cells having respective resistive components connected between respective row and column traces without passing through transistors or diodes (claim 25).

Conclusion

2. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lowry et al. (US Patent 6,314,014) disclose that the volume of the phase change materials changes with different states (see column 1 lines 33-60).

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bradley K. Smith whose telephone number is (571) 272-1884. The examiner can normally be reached on 10-6 Monday through Friday.

Art Unit: 2891

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Brad Smith', is positioned above the printed name.

Brad Smith
Primary Examiner
Art Unit 2891